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(54) Vehicle roof

(57) A road vehicle consisting of a body shell having an open-top driver and passenger compartment (12), a roll hoop member (18) extending transversely of the compartment which is pivotally connected to the body shell (10) for movement in a rearward direction from an erect upright position to a folded position.

Strut assemblies (26) are provided between the roll hoop member (18) and the body shell (10) at the rear of the driver and passenger compartment to retain the roll hoop member (18) in the erect position and to restrict forward movement thereof. A rear hood section (38) formed of flexible material is connected between the roll hoop member (18) and the body shell (10) at the rear of the passenger compartment and this hood section is tensioned by the strut assemblies (26). A removable roof panel (40) is positioned between a windscreen structure (14) and the front edge of the roll hoop member (18) and is held in position by the strut assemblies retaining the roll hoop member in the erect position.

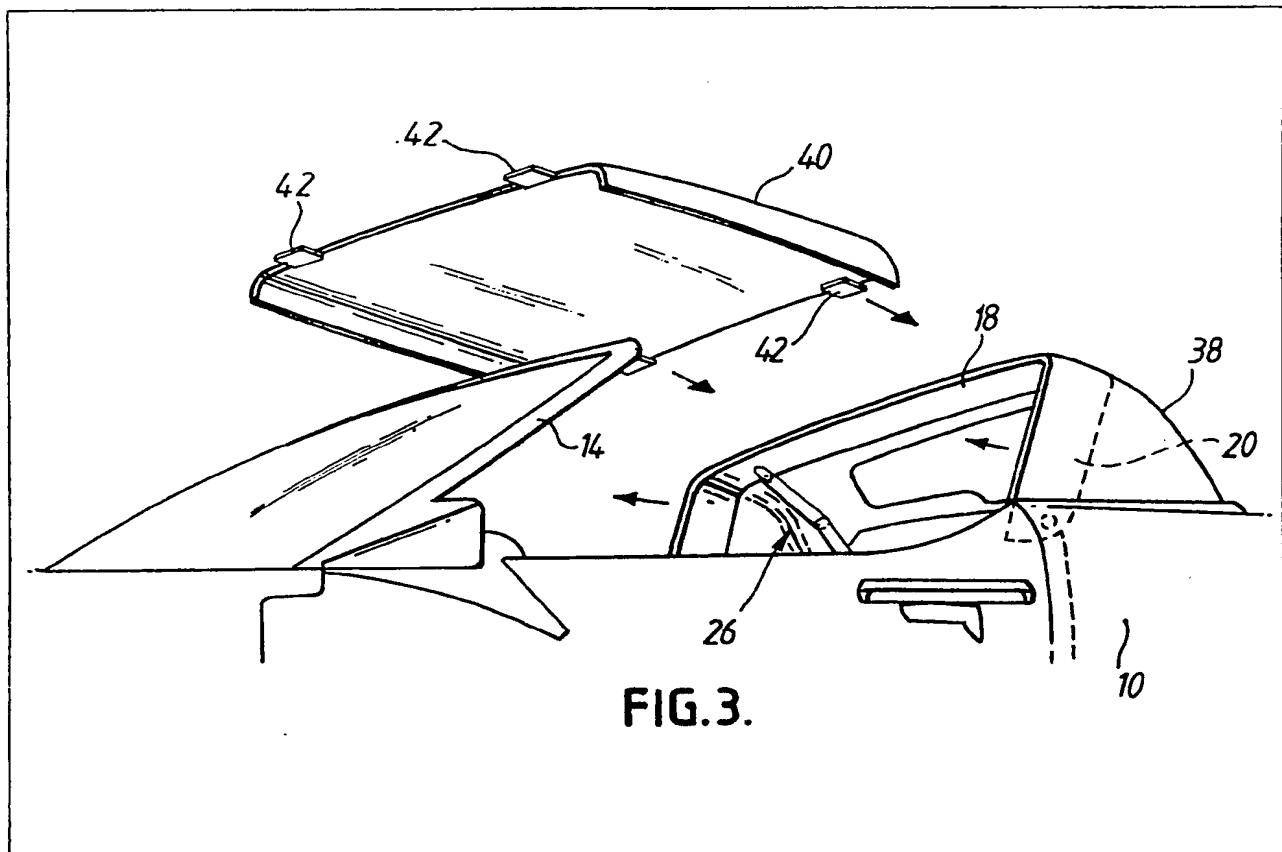


FIG. 3.

GB 2 086 316 A

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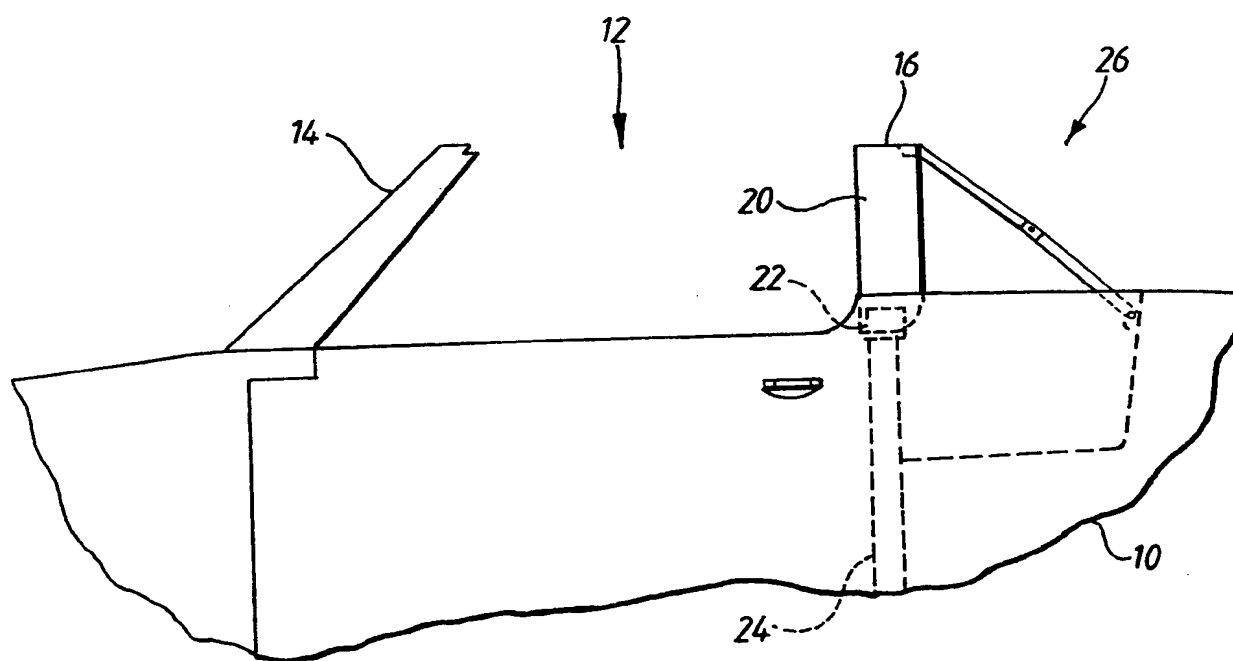


FIG. 1.

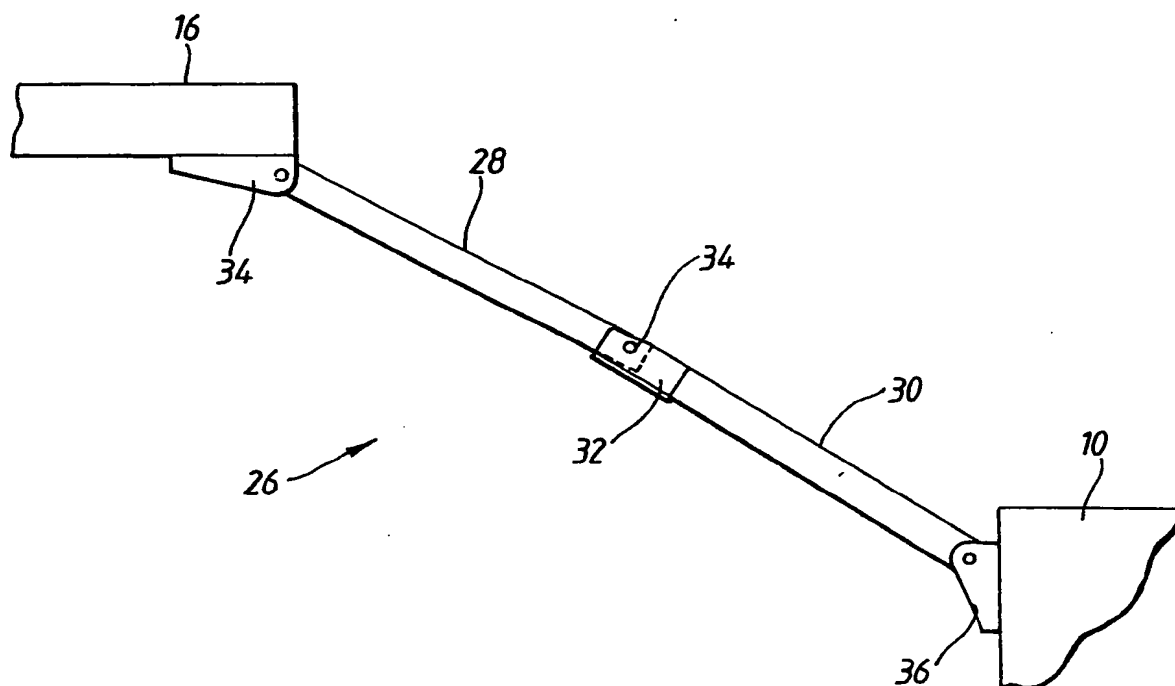


FIG. 2.

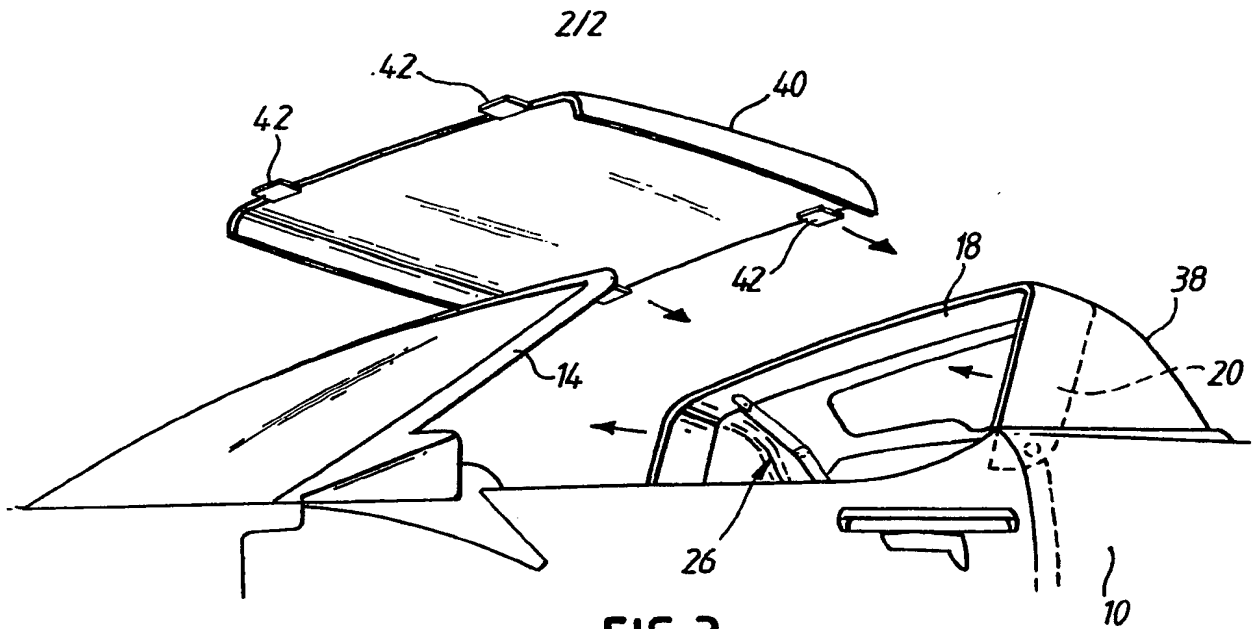


FIG. 3.

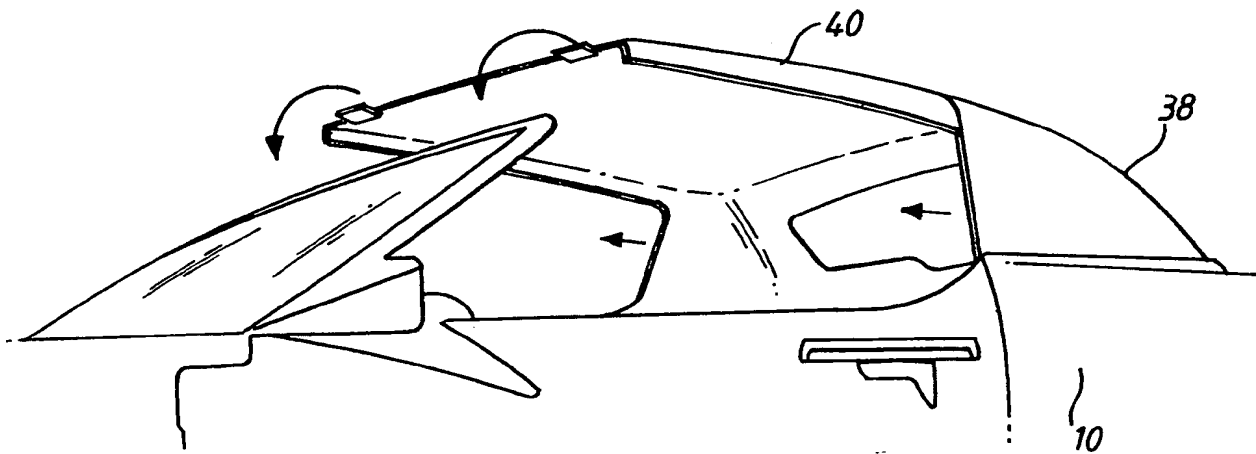


FIG. 4.

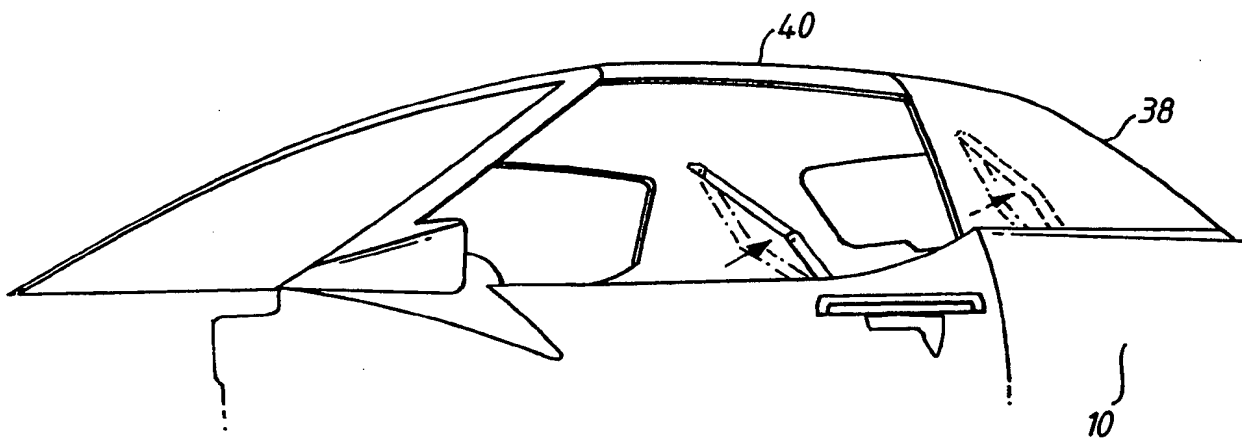


FIG. 5.

SPECIFICATION

Improvements in or relating to vehicles

This invention relates to vehicles and more particularly to a road vehicle of the type usually described as a convertible or open-top sports car.

- 5 A convertible or open-top sports car normally comprises a body shell having the driver and passenger compartment with an open top. The open top of this compartment is conventionally provided with a removable roof structure and known removable or foldable roof structures include hoods and other removable panels.

10 However, where these previously known roof structures have been arranged to fold to open the top of the driver and passenger compartment it has been necessary to provide a relatively complex mechanism of foldable stays and to also provide a multiplicity of latches to retain the hood and the associated stays in their erect condition.

- 20 The object of this invention is to provide a vehicle having a simpler form of removable and/or foldable roof structure than the known structures referred to above.

- According to this invention, a road vehicle comprises a body shell having an open-topped driver and passenger compartment; and a roll hoop member extending transversely of the compartment, the roll hoop member being a unitary structure consisting of a central portion having downwardly depending end sections at each end thereof; wherein the roll hoop member is pivotally connected at or adjacent to the free ends of the end sections to the body shell for pivotable movement from an erect upright position to a folded position and retaining means is provided for retaining the roll hoop member in the upright position.

- Preferably, the roll hoop member is pivotally movable in a rearward and downward direction relatively to the body shell of the vehicle from the erect position to the folded position. Preferably, also, the retaining means restricts the movement of the roll hoop member in a forward direction when the member is moved from the folded to the erect position.

- The retaining means, preferably, comprises one or more strut assemblies extending between the roll hoop member and the portion of the body shell at or adjacent to the rear of the driver and passenger compartment. Preferably, the or each strut assembly comprises a first strut which is pivotally connected at one end to one end of a second strut, and when the roll hoop member is in the erect position, the first and second struts are arranged to be in substantial alignment and to extend between the roll hoop member and the body shell of the vehicle. Preferably, also, the first and second struts are adapted to pivot about their pivotal interconnection to an over-centre position when the roll hoop member is in the erect position so that the strut assembly is capable of withstanding longitudinal compressive forces imposed thereon.

Preferably, the end of the first strut remote from

- 65 the second strut is pivotally connected to the portion of the body shell at or adjacent to the rear of the driver and passenger compartment. Preferably, also, the end of the second strut remote from the first strut is pivotally connected

- 70 to the roll hoop member.

- Preferably, a rear hood section formed of flexible material is connected between the roll hoop member and the portion of the body shell forming the rear of the driver and passenger compartment. Preferably, also, the rear head section is permanently connected to the roll hoop member and/or to the body shell. The retaining means is, preferably, not only adapted to maintain the roll hoop member in the erect position but is also adapted to tension the material of the rear hood section.

- Preferably, a roof panel is releasably securable between the front edge of the roll hoop member and a windscreen structure on the body shell of the vehicle. Preferably, also, the roof panel is provided with one or more recesses or projections on the front and rear edges thereof which engage with corresponding projections or recesses on the roll hoop member and the windscreen structure to retain the roof panel in position when the roll hoop member is in the erect position.

A preferred embodiment of this invention will now be described, by way of example only, with reference to the accompanying drawings of

- 95 which:—

Figure 1 is a diagrammatic side elevation of a central portion of a convertible or sports car with parts omitted for the sake of clarity;

- 100 Figure 2 is a diagrammatic side elevation of a strut assembly;

Figure 3 is a diagrammatic perspective view of the central portion of the convertible or sports car with a roof panel ready for insertion thereon;

- 105 Figure 4 is a diagrammatic perspective view of the central portion of the convertible or sports car with the roof panel partially inserted thereon; and

Figure 5 is a diagrammatic perspective view of the central portion of the convertible or sports car with the roof panel fully inserted thereon.

- 110 Referring now to the drawings, a convertible or sports car comprises a body shell 10 having a driver and passenger compartment with an open top indicated generally at 12. A conventional windscreen structure 14 is provided at the front of the compartment 12 and a transversely extending roll hoop member 16 is mounted adjacent the rear of the compartment 12.

- The roll hoop member 16 is a unitary structure composed of a lamination of glass-reinforced plastics and foam material. The roll hoop member 16 consists of a central portion 18 having downwardly depending end sections 20 at each end thereof. The lower end of each end section 20 have a metal plate 22 secured thereto and these metal plates are pivotally connected to the upper ends of associated support tubes 24 which are in turn secured to and form an integral part of the body shell 10. The pivotal connection of the metal plates 22 to the tubes 24 results in the roll hoop

member 16 being pivotally connected to the body shell 10 so that the roll hoop member is pivotable about an axis extending transversely of the vehicle from an erect upright position to a folded

5 substantially horizontal position by moving the roll hoop member 16 rearwardly and downwardly.

The roll hoop member 16 is retained in the erect upright position by two spaced-apart strut assemblies indicated generally at 26 which extend
10 between the roll hoop member 16 and the portion of the body shell 10 at the rear of the driver and passenger compartment 12.

Each strut assembly 26 comprises two pivotally interconnected struts 28 and 30. The pivotal
15 interconnection between the struts 28 and 30 consists of a member 32 which is substantially U-shaped in cross-section which is secured to one end of the strut 30, into which the corresponding end of the strut 28 is inserted and a pivot pin 34
20 extends through the side portions of the member 32 and the end of the strut 28 to effect pivotal interconnection therebetween. The axis of the pivot pin 34 is off-set from the central longitudinal axis of the strut 30 so that when the two struts 28
25 and 30 are moved so as to be longitudinally aligned, the struts 28 and 30 are capable of moving to an over-centre position.

The end of the strut 28 remote from the strut 30 is pivotally connected to a bracket 34 which is
30 secured to the roll hood 16 and the end of the strut 30 remote from the strut 28 is pivotally connected to a bracket 36 which is secured to the portion of the body shell 10 at the rear of the driver and passenger compartment.

35 When the roll hoop member 16 is moved to the erect position, the movement of the struts 28 and 30 to the over-centre position shown in Figure 2 of the drawings enables the struts 28 and 30 to be able to bear longitudinal compressive forces
40 exerted thereon. In addition, the pivotal connection of the struts 28 and 30 to the roll hoop member 16 and to the body shell 10 restricts and controls forward movement of the roll hoop member 16.

45 A rear hood section 38 is permanently secured between the roll hoop member 16 and the body shell 10 at the rear of the driver and passenger compartment 12 and a roof panel 40 is releasably secured between the windscreen structure 14 and
50 the front edge of the roll hoop member 16. The roof panel 40 is provided on its front and rear edges with spaced-apart projections 42 which engage in corresponding recesses (not shown) in the windscreen structure 14 and in the roll hoop
55 member 16 so that the roof panel 40 is retained in position thereby.

It will be appreciated that the roof panel 40 is thus held in position solely by the roll hoop member 16 being retained in the erect position by
60 the strut assemblies 26 and the flexible material of the rear hood section 38 is also tensioned by said strut assemblies 26 maintaining the roll hoop member 16 in the erect position. Consequently, when the roof panel 40 is to be removed it is only
65 necessary to release the strut assemblies 26 and

move the roll hoop member 16 in a rearward direction. Furthermore, if the rear hood section 38 is to be folded, it is only necessary to continue the rearward movement of the roll hoop member 16
70 to its fully folded position, or, if desired, a "Targa" top configuration of roof can be formed after the roof panel 40 has been removed by returning the roll hoop member 16 to the erect condition and relocking the support strut assemblies 26.

75 In a modification, the strut assemblies 26 are replaced by one or more spring-loaded damper assemblies connected between arms extending from the end sections 20 of the roll hoop member 16 and the body shell 10 so that the or each
80 spring-loaded damper assembly urges the roll hoop member 16 into the erect position.

In a further modification, the end of the strut 28 remote from the strut 30 is not pivotally connected to the roll hoop member 16, but is
85 provided with a suitable configuration which is adapted to bear against the rear edge of the roll hoop member but is not permanently connected thereto. If this modification is adopted, it is necessary to provide additional stop means for
90 restricting the forward movement of the roll hoop member beyond the erect condition.

In yet another modification, a locking mechanism is provided for retaining the strut members 28 and 30 in their over-centre position.

95 CLAIMS

1. A road vehicle comprising a body shell having an open-topped driver and passenger compartment; and a roll hoop member extending transversely of the compartment, the roll hoop
100 member being a unitary structure consisting of a central portion having downwardly depending end sections at each end thereof; wherein the roll hoop member is pivotally connected at or adjacent to the free ends of the end sections to the body shell
105 for pivotable movement from an erect upright position to a folded position and retaining means is provided for retaining the roll hoop member in the upright position.

2. A road vehicle according to Claim 1, wherein
110 the roll hoop member is pivotally movable in a rearward and downward direction relatively to the body shell of the vehicle from the erect position to the folded position.

3. A road vehicle according to Claim 1 or
115 Claim 2, wherein the retaining means restricts the movement of the roll hoop member in a forward direction when the member is moved from the folded to the erect position.

4. A road vehicle according to any one of the preceding claims, wherein the retaining means
120 comprises one or more strut assemblies extending between the roll hoop member and the portion of the body shell at or adjacent to the rear of the driver and passenger compartment.

125 5. A road vehicle according to Claim 4, wherein the or each strut assembly comprises a first strut which is pivotally connected at one end to one end of a second strut, and when the roll hoop member

is in the erect position, the first and second struts are arranged to be in substantial alignment and to extend between the roll hoop member and the body shell of the vehicle.

5 6. A road vehicle according to Claim 5, wherein the first and second struts are adapted to pivot about their pivotal interconnection to an over-centre position when the roll hoop is in the erect position so that the strut assembly is capable of
10 withstanding longitudinal compressive forces imposed thereon.

7. A road vehicle according to Claim 5 or Claim 6, wherein the end of the first strut remote from the second strut is pivotally connected to the
15 portion of the body shell at or adjacent to the rear of the driver and passenger compartment.

8. A road vehicle according to any one of Claims 5 to 7, wherein the end of the second strut remote from the first strut is pivotally connected
20 to the roll hoop member.

9. A road vehicle according to any one of the preceding claims, wherein a rear hood section formed of flexible material is connected between the roll hoop member and the portion of the body
25 shell forming the rear of the driver passenger compartment.

10. A road vehicle according to Claim 9, wherein the rear hood section is permanently connected to the roll hoop member and/or to the
30 body shell.

11. A road vehicle according to Claim 9 or Claim 10, wherein the retaining means is not only adapted to maintain the roll hoop member in the erect position but is also adapted to tension the
35 material of the rear hood section.

12. A road vehicle according to any one of the preceding claims, wherein a roof panel is releasably securable between the front edge of the roll hoop member and a windscreen structure on
40 the body shell of the vehicle.

13. A road vehicle according to Claim 12, wherein the roof panel is provided with one or more recesses or projections on the front and rear edges thereof which engage with corresponding
45 projections or recesses on the roll hoop member and the windscreen structure to retain the roof panel in position when the roll hoop member is in the erect position.

14. A road vehicle constructed, arranged and adapted to operate substantially as hereinbefore described with reference to, and as illustrated by,
50 the accompanying drawings.